

WHAT IS CLAIMED IS:

1. A method for estimating retransmission timeout (RTO_J) used in a communication system to support multiple retransmission of the same packet between a server and a client, the method comprising the steps of:

- (a) transmitting a plurality of data packets from said server to said client;
- (b) transmitting a negative acknowledgment (NACK) packet for retransmission by said client if one of said data packets is missing;
- (c) computing a round-trip delay (RTT) corresponding to a latency between sending said NACK packet to said server and receiving the corresponding retransmission of said missing packet from said server;
- (d) calculating a plurality samples of delay (\square_J) between the reception adjacent packets of said plurality of data packets by said client;
- (e) determining a smoothed inter-packet delay variance ($SVAR \square_J$) based on said calculated delay samples; and,
- (f) computing said RTO_J based on said determined RTT , and said determined smoothed inter-packet delay variance.

2. The method of claim 1, further comprising the step of controlling retransmission of said NACK based on said computed RTO_J , said computed RTO_J being a delay between subsequent transmissions of said NACK packet from said client to said server.

3. The method of claim 1, wherein said $SVAR\Box_j$ is determined according to

$$SVAR\Box_j = (1 - \Box_1) * SVAR\Box_{j-1} + \Box_1 * D,$$

wherein \Box_1 being set to 0.25 and D being the absolute difference of $\Box_j - SVAR\Box_{j-1}$.

5 4. The method of claim 1, wherein said RTO_J is determined according to

$$RTO_J = n * RTT_i + m * SVAR\Box_j,$$

wherein n being set between 0 and 4 and m being set to $m = 4.2792 * n - 2.6646$.

5. The method of claim 1, wherein the communication link between said server

10 and said client comprises at least one of a wireless communications link, a wired communication link, and the combination of a wired communication link and a wireless communications link.

6. A method for managing transmission of a plurality of data packets over a

15 communications link between a server system and a client system; the method comprising the steps of:

(a) transmitting a plurality of burst packets from said server to said client;

(b) transmitting a negative acknowledgment (NACK) packet for retransmission by said

client if one of said burst packets is lost;

20 (c) determining a round-trip delay (RTT_i) corresponding to the actual time between the

transmitting said NACK packet by said client and a determination by said client said lost burst packets was transmitted successfully;

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communications link.

11. A system for estimating retransmission timeout (*RTO*) used in a communication system to support multiple retransmission of the same packet between a server system and a client system, comprising:

means for controlling said multiple retransmissions of a data packet between said server system and said client system over said communication link based on an actual around-trip delay (RTT) and a smoothed inter-packet delay variance (*SVAR*) associated with said client system, said RTT being a latency between sending a negative acknowledgment (NACK) packet to said server system responsive to a lost packet and receiving the corresponding retransmission of said lost packet from said server, said smoothed inter-packet delay variance (*SVAR*) being variation of delays before and after each received packet or burst of packets, whereby the over-estimation and under-estimation of said *RTO* is relatively minimized.

12. A system for managing transmission of a plurality of data packets over a communications link between a server system and a client system, comprising:

means for receiving said data packets in the form of frame comprised of packets;

means for determining whether any frame packets were lost during transmission;

means for requesting that any lost frame packets be retransmitted;

20 means for determining a round-trip delay (*RTT*) corresponding to a latency between requesting retransmission of said lost frame to said server and receiving the corresponding retransmission of said lost frame from said server;

means for determining inter-burst packet delay variations; and,
 means for determining a retransmission timeout (RTO_J) based on said determined RTT
 and said determined inter-burst delay variations.

5 13. The system of claim 12, wherein said means for determining said RTO_J further
 comprises a means for determining an inter-burst delay (\square_J) between the reception of a first
 packet of said lost burst packets and a last packet of a prior burst packets; and, a means for
 determining a smoothed inter-burst delay variance ($SVAR\square_J$),

10 14. The system of claim 12, further comprising a means for controlling multiple
 retransmission of said NACK based on said computed RTO_J , said computed RTO_J being a
 delay transmission of said NACK packet from said client to said server.

15 15. The system of claim 12, wherein said $SVAR\square_J$ is determined according to

$$SVAR\square_J = (1 - \square_1) * SVAR\square_{J-1} + \square_1 * D,$$

 wherein \square_1 being set to 0.25 and D being the absolute value of $\square_J - SVAR\square_{J-1}$.

20 16. The system of claim 12, wherein said RTO_J is determined according to

$$RTO_J = n * RTT_i + m * SVAR\square_J,$$

wherein n being set between 1 and 4 and m being set to $m = 4.2792 * n - 2.6646$.